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Agricultural Experiment Station
University of Kentucky
THOMAS P. COOPER, Director

CIRCULAR NO. 45

APHIDS

Lexington, Ky.
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A typical aphid injury to tree foliage. Photo by Vaughn.

CIRCULAR NO. 45

APHIDS

By W. A. PRICE

Aphids constitute a group of insects widely distributed over this country. They are a source of considerable annoyance and loss because they attack a great variety of plants, including shrubbery, herbaceous flowering plants, fruit and ornamental trees, vegetables, grain and forage crops. There are many different species of aphids with a variety of plant preferences. Some species feed exclusively on one kind of plant; others, like grain aphids, attack a number of different hosts. This species lives on apple trees during the winter and early spring, migrates to small grain before harvest, then to grasses and weeds and, finally, in the fall, to apple trees for egg-laying.

DESCRIPTION

There are three distinct stages in the development of aphids. These are egg, nymph and adult. The eggs are oval in shape and about the size of a pinhead. When first laid they are yellow in color, often changing to a shining jet-black with age. In the winter they may be found most frequently on the twigs and sprouts of fruit and forest trees.

In the life cycle of aphids, the nymph is the stage between egg and adult. Nymphs are small, soft-bodied, wingless (except for wing-stubs), slow-moving individuals, resembling adults in shape. Species differ in certain details but, in general, they have similar characteristics. Most common species are pale green in color.

Adults, like nymphs, differ in color, form and size with the species. Their bodies are pear-shaped with two horn-like projections on the enlarged or rear end. The six legs are long, slender and delicate in comparison with the heavy body which

they support. The predominant color in most species is green. In all species there are two forms of adults, winged and wingless. In all other details the forms are the same. When wings

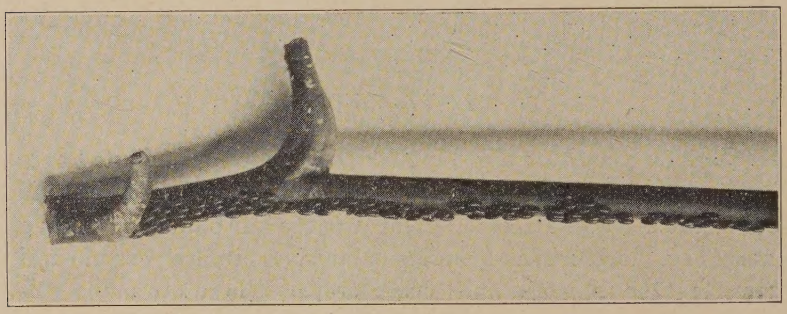

Fig. 1. Black, shining aphid eggs as they appear on a twig in winter. Photo by Vaughn.

are present, they are four in number, comparatively large and membranous and, when at rest, lie folded tent-like over the abdomen.

LIFE HISTORY

While the details of seasonal development differ somewhat with the species, all of our common aphids are sufficiently similar in this respect to be discussed as a group. They pass the winter in the egg stage. Eggs are usually deposited in the crevices of the bark, or in the folds near the base of buds or branches of trees. The young insects may hatch from these eggs when foliage begins to develop or, in some cases, not until early or midsummer. The nymphs move to a favorable situation, along the stalk of a plant, on the under side of a leaf, or on the tip of a twig where the tissue is tender. There they insert their sucking mouth-parts and draw liquid nourishment from the plant. These young are all females and are known as "stem mothers". In a few days they are full-grown and start giving birth to living young, all of which are females. This process continues thruout the summer and in some species as many as 18 generations are produced during a single season. Some of the individuals in each generation, except the very early ones, are

winged. Thus provision is made for dissemination to other plants. Of the last generation in the fall males and females in about equal numbers are born. This is the only generation during the season in which there are any males. After mating, the females lay fertilized eggs which remain unhatched over winter. These are the only eggs produced during the year.

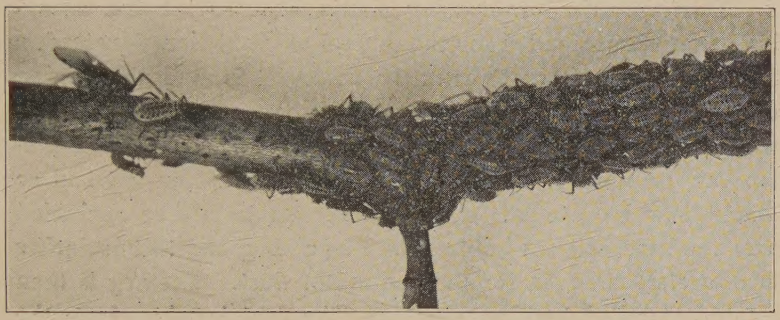

Fig. 2. A cluster of nymphs and mature aphids—a winged adult at the extreme left. Photo by Vaughn.

INJURY

The appearance of injury to vegetation infested with aphids will depend somewhat upon the particular plant in question and the species of aphid attacking it. Several of our common species of plant lice collect on the under sides of leaves of trees causing these leaves to become curled and crinkled, as exemplified in the snowball. Cabbage, kale and turnip plants tend to turn yellow when attacked by aphids. Melon plants wilt and the leaves droop. The primary injury to all plants is caused by the withdrawal of sap.

CONTROL MEASURES

Spraying. Nicotine sulfate is recommended for the control of aphids generally. Where it is possible to apply a spray directly to the insects, this method is advised. A great majority of cases may be treated this way. The spray solution is made by adding one and a half or two teaspoons of a 40 percent solution of nicotine sulfate to a gallon of water in which an inch

cube of soap has been dissolved. Soap acts as a spreader and makes the insecticide more effective. On a larger scale, 2 pounds of soap and ⅜ of a pint of the nicotine sulfate solution to 50 gallons of water is the formula. The spray should be applied with pressure and, to be effective, must touch the body of the insect. Applications should be thoro and repeated if necessary.

Dusting. On low-growing plants, such as turnips, spraying is not recommended for the control of plant lice. Instead, a 2 percent nicotine dust should be used. It is made by mixing thoroly 5 pounds of a 40 percent solution of nicotine sulfate with 100 pounds hydrated lime. The lime is placed in a 25-gallon keg, or similar container, which is mounted on a stand so that it may be rotated. The nicotine sulfate is then sprinkled over the lime and one-half pound of pebbles, one to two inches in diameter, is added for each pound of dust. The keg is then rotated or rolled for five minutes. The dust is taken from the keg and run thru a screen or open mesh cloth to remove pebbles and break up any moist lumps remaining. This dust loses its strength rapidly and should be used reasonably soon after mixing. Material not used at once should be kept in air-tight containers.

Application of the dust to infested plants may be made with any of the dusting machines, but preferably those of the bellows type. It should be applied to dry plants on a quiet day when the temperature is 70 degrees Fahrenheit or above.

Control measures should be used as soon as aphids are found on the plants. Since the insects develop rapidly, a close watch should be kept for their first appearance. Turnips already beginning to turn yellow from their attacks are usually too badly damaged to make control profitable.

The same dust can be used effectively for the destruction of aphids on melon and cucumber plants. However, it is possible to reach the under sides of the leaves of such plants with a spray if a power outfit is used. Where such equipment is available it can be used advantageously to control aphids if a pressure of

about 300 pounds per square inch can be developed. The materials to use are nicotine sulfate, soap and water in the proportions mentioned above.

The spray nozzle should be held low and at the side of the vine. The force of the spray turns the leaves up so that the

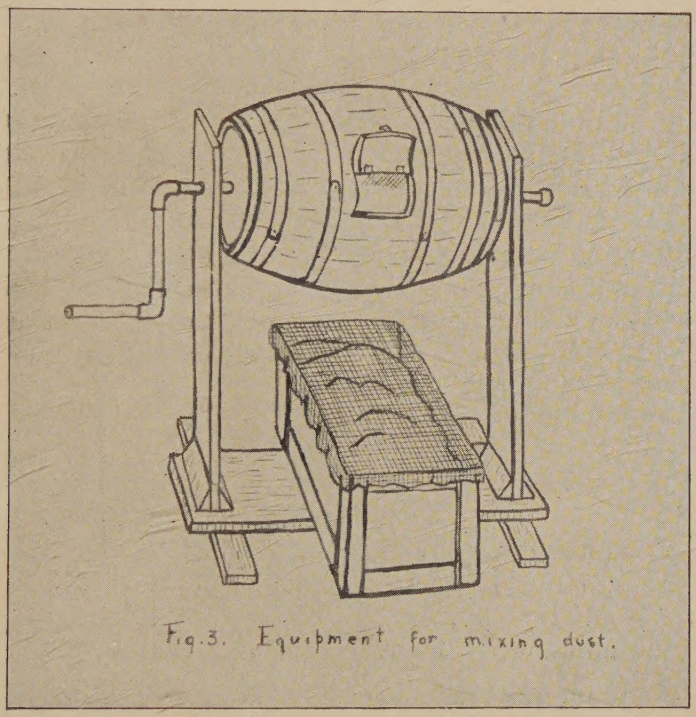

Fig. 3. Equipment for mixing dust.

liquid covers the under sides of the leaves where the aphids are located.

TOBACCO TEA

Waste tobacco can be used for making a spray for the control of aphids, tho it is not generally recommended because the nicotine content varies widely. If such use of tobacco is desired, the following recommendations are made by the Kentucky Agricultural Experiment Station.*

* Dr. J. S. McHargue, Chemist.

The parts of the plant to be used should be dried, stored in a tight container and kept in a dry place until the time comes for making the extract. The day before the spray is to be used, the dry tobacco is placed in a barrel or other suitable container and enough warm water added to just cover the tobacco when weighted down with a few pieces of board and stones. It should be allowed to stand over night. The next morning the liquid is pressed out and strained thru a gunny sack. The strength of this extract can be tested approximately by taking about one pint and slowly diluting it with water until it no longer kills plant lice. With the proportion thus ascertained, enough water is then added to the remaining volume of extract to bring it to a dilution that kills the insects, as shown by trial.

In a trial test with a sample of tobacco which contained 3.80 percent of nicotine, it was found that one pound of such tobacco soaked in one gallon of water gave an extract which contained .054 percent of nicotine, which is about the right strength to use against aphids.

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